

ON THE LAND-SHELLS OF WESTERN AUSTRALIA.

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PLATE VII. Figs. 8-32.

IT is an axiom with conchologists that reports upon restricted faunas with lists of the indigenous species are of great utility, and interesting, not only to those persons who are located in the particular region, but to others who may have collections from the special districts treated of.

The British Museum (Natural History) having received collections from certain islands situated off the N.W. coast of Australia and from various places on the mainland of W. Australia, the writer of the following notes was induced to examine and report upon the land-mollusca generally which inhabit this part of the world.¹

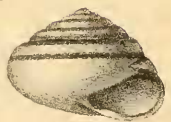
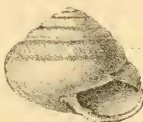
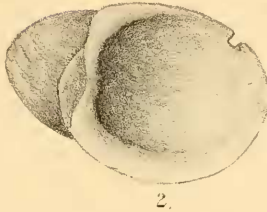
During the years 1890 and 1891 H.M.S. "Penguin" was engaged in surveying operations off the north-west coast of Australia, and one of the officers of the vessel, Mr. J. J. Walker, chief engineer, devoted much of his spare time to collecting insects, shells, and other objects of natural history. He is an exceptionally keen observer, and obtained very large and important collections of invertebrata of all orders, especially insects. The British Museum (Natural History) is greatly indebted to him for the energy he displayed, and to Capt. W. U. Moore, in command of the vessel, for the facilities he afforded.

Hitherto no land-shells had been collected at any of the islands off the north-west of Australia, and therefore the specimens obtained by Mr. Walker have a special interest, the majority being new to science. Up to the present time only thirty-five² species have been recorded, and it is therefore a great satisfaction to be able now to add as many as eighteen to the list, bringing up the total number of known species to fifty-three.

The land-shells of Western Australia are not as remarkable for

¹ The report is limited to those species occurring west of long. 129° E., the boundary line between West Australian and South Australian territory. Its extreme length from north to south is 1,250 miles and 800 from east to west, and it embraces an area of 1,060,000 square miles.

² *Helix forrestiana*, Angas, (P.Z.S. 1875, p. 389, pl. xlv. fig. 3) is not included in this number, as the locality, N.W. Australia, is somewhat indefinite.



variety of form, coloration, or size, as many of the species which are met with in the north and north-east of the continent.

The predominant forms among the Helicea belong to the sections *Rhagada*, *Hadra*, and *Patula*, and the *Bulimi* are restricted to the sub-genus *Liparus*.

A remarkable feature is the scarcity of operculate forms, a characteristic which is applicable also to the rest of Australia.

Only four species are known from the West, of which one was obtained by Mr. Walker.

Besides the rarity of Operculata, it may be as well to notice the absence of certain other forms of land-mollusca. No species of *Vitrina*, *Helicarion*, *Pupina*, or *Diplomatina*, and not a slug of any kind are yet known from this region, but this may arise from the fact that the country is, comparatively speaking, unexplored conchologically, and it is more than probable that when it has been further investigated it will prove to be much richer in terrestrial forms.

Another feature in connection with the land-shells of West Australia is their distinctness from those which occur on the opposite side of the continent; and, only in one instance, does the same form occur in the north and west: a single species is also common to the south and west. This difference may be due to the fact that large desert tracts divide the eastern from the western portion of the country. How far some of the species range eastward we do not know, for the country inland is practically a *terra incognita* to the conchologist.

The first land-shells collected in West Australia were obtained by Capt. P. P. King, and were described by Dr. Gray in 1825. Subsequently MM. Quoy and Gaimard, during the voyage of the "Astrolabe," discovered a few other species, which were described by them in the account of the voyage of that vessel in 1832. Menke in 1843 described three new species collected by Dr. Preiss; a few new forms obtained by Dr. Bacon were published by Benson in 1853 and 1854; and a few other species have also been described by Reeve, Pfeiffer, Cox, Brazier, Angas, and myself.

With regard to the relationship of the fauna of West Australia it is difficult to make any comparison. It appears, to some extent, to have a specialized fauna of its own. True, some of the forms of *Hadra* bear relationship with certain species which occur in the northern parts of the continent, and some of the *Bulimi* have representatives in South Australia. However, the group *Rhagada* among the Helices and the *Bulimi* of the section *Liparus* are characteristically West Australian forms.

Bulimus Kingii is the only species of West Australian land-shells of which the animal has been described and figured. An account of this species is given by Quoy and Gaimard under the name of *Helix trilineata*. They also make a few remarks on the animal of *B. melo*.

CLASSIFIED LIST OF SPECIES.

LIMACIDÆ.		<i>Helix</i> (<i>Xerophila</i>) <i>australis</i> , Menke.
<i>Lamprocystis lissa</i> , n.sp.		<i>Bulimus</i> (<i>Liparus</i>) <i>dux</i> , Pfr.
<i>Vitrea Georgiana</i> , Q. and G.		" " <i>Ponsonbii</i> , Angas.
HELICIDÆ.		" " <i>indutus</i> , Menke.
<i>Patula millestriata</i> , Smith.		" " <i>meio</i> , Q. and G.
" <i>sublesta</i> , Benson.		" " <i>Leeuwinensis</i> , n.sp.
" <i>cygnaea</i> , Benson.		" " <i>Onslowi</i> , Cox.
" <i>Albanensis</i> , Cox.		" " <i>bulia</i> , Menke.
" <i>nupera</i> , Brazier.		" " <i>Baconi</i> , Benson.
" <i>cuprea</i> , Cox.		" " <i>Kingii</i> , Gray.
" <i>Morti</i> , Cox.		" " <i>physioides</i> , Reeve.
		PUPIDÆ.
<i>Helix</i> (<i>Chloritis</i>) <i>millepunctata</i> , n.sp.		<i>Pupa pacifica</i> , Pfr.
" " <i>rectilabrum</i> , n.sp.		" <i>lepidula</i> , Ad. and Ang.
" (<i>Gonostoma</i>) <i>Baudinensis</i> , Smith.		" <i>contraria</i> , n.sp.
" " <i>Collingii</i> , Smith.		" <i>Lincolnensis</i> , Cox.
" (<i>Rhagada</i>) <i>leptogramma</i> , Pfr.		" <i>Wallabyensis</i> , n.sp.
" " <i>Reinga</i> (Gray), Pfr.		" <i>Mooreana</i> , n.sp.
" " <i>Richardsonii</i> , Smith.		
" " <i>convicta</i> , Cox.		SUCCINEIDÆ.
" " <i>tescorum</i> , Benson.		<i>Succinea scalarina</i> , Pfr.
" " <i>inconvicta</i> , n.sp.		" <i>strigillata</i> , Ad. and Ang.
" " ? <i>plectilis</i> , Benson.		" <i>aperta</i> , Cox.
" " ? <i>carcharias</i> , Pfr.		
" (<i>Hadra</i>) <i>obliquirugosa</i> , n.sp.		CYCLOPHORIDÆ.
" " <i>Prudhoeensis</i> , n.sp.		<i>Cyclophorus liricinctus</i> , Benson.
" " <i>Burnerensis</i> , n.sp.		" <i>orbiculatus</i> , Benson.
" " <i>Montalivetensis</i> , n.sp.		
" " <i>Sykesi</i> , n.sp.		TRUNCATELLIDÆ.
" " <i>imitata</i> n.sp.		<i>Coxiella striatula</i> , Menke.
" (<i>Trachia</i>) <i>Derbyana</i> , n.sp.		
" " <i>Bathurstensis</i> , n.sp.		HELICINIDÆ.
" " <i>Gascoynensis</i> , n.sp.		<i>Helicina Walkeri</i> , n.sp.

Family LIMACIDÆ.

LAMPROCYSTIS LISSA,¹ n.sp. Pl. VII. Figs. 22-3. B.M.²

Testa anguste perforata, orbicularis, superne depresso conoidea, tenuis, cornea, nitida, lineis incrementi tenuissimis striisque spiralibus microscopicis sculpta; anfractus 5 convexiusculi, infra suturam anguste marginati, ultimus leviter descendens; spira breviter conoidea, ad apicem obtusiuscula; apertura oblique lunata, parva; peristoma tenue, marginibus subconviventibus, callo tenui junctis, columellari incrassato, supra perforationem dentem peculiarem formante; umbilicus angustissimus, carina intrante ad columellæ dentem terminante instructus. Diam. maj. 8.5, min. 8 mm.; alt. 5 mm. Apertura 3 alta, 3.5 lata. *Hab.*—Queen's Islet, Parry Island (Walker); Burner Ranges (Cox); all N.W. Australia.

¹ λίσσος, smooth.

² The letters "B.M." indicate that the species is in the British Museum (Natural History).

This species is well characterized by the peculiar dentiform thickening of the columella and the ridge which arises from it, and passes up the very contracted umbilicus. It is about the same size and shape as "*Helix rustica*" of Pfeiffer, found on the opposite side of Australia, but differs in the umbilicus and columella.

VITREA GEORGIANA, Quoy and Gaimard.

Cox, Monog. Austral. Land-Shells, p. 28, pl. xix. fig. 1.

Hab.—Port King George, S.W. Australia.

Family HELICIDÆ.

PATULA MILLESTRIATA, Smith. B.M.

Tryon, Man. Conch. ser. II. vol. i. p. 130.

Hab.—Depuch's Island, W. Australia.

This is the largest of the W. Australian *Patulæ* at present described. Several bear a very strong family resemblance, but appear to be distinguishable in certain minute details.

PATULA SUBLESTA, Benson. B.M.

Cox, *op. cit.* p. 16, pl. xi. fig. 10.

Hab.—Near Freemantle, W. Australia (Benson).

PATULA CYGNÆA, Benson. B.M.

Cox, *op. cit.* p. 16, pl. xii. fig. 3.

Hab.—Perth, W. Australia (Benson).

PATULA ALBANENSIS, Cox. B.M.

Cox, *op. cit.* p. 15, pl. iv. fig. 2.

Hab.—King George's Sound, S.W. Australia.

PATULA NUPERA, Brazier.

Helix (Charopa) nupera, Brazier, Proc. Linn. Soc. New South Wales, 1876, vol. i. p. 18; Pfeiffer, Mon. Hel. vol. viii. p. 568.

Hab.—King George's Sound, S.W. Australia.

PATULA CUPREA, Cox.

Cox, *op. cit.* p. 22, pl. xii. fig. 9.

Hab.—King George's Sound, S.W. Australia.

This and the preceding species may possibly be the same, for they have, judging from the descriptions, many points in common; they occur in the same locality and were both collected by Mr. G. Masters.

PATULA MORTI, Cox.

Cox, *op. cit.* p. 21, pl. xi. fig. 13.

Hab.—Sydney, and other places in New South Wales, S. Australia, W. Australia, and Tasmania (Cox).

This is the only instance among the Australian Helices in which the same species occurs on both sides of the continent.

HELIX (CHLORITIS) MILLEPUNCTATA, n.sp. Pl. VII. Fig. 11. B.M.

Testa orbicularis, late umbilicata, tenuis, cornea, subpellucida; anfractus 5 lente accrescentes, undique minute punctati, convexi, sutura profunda sejuncti, striis incrementi tenuibus oblique arenatis sculpti, ultimus ad peripheriam rotundatus, antice vix descendens; apertura oblique et late lunata, spira brevissima, ad apicem obtusiuscula; peristoma tenue, parum incrassatum, anguste expansum et reflexum, margine columellari perobliquo, paulo arcuato, superne ad insertionem breviter dilatato. Diam. maj. 16, min. 13 mm.; alt. 8.5 mm. Apertura 6 alta, 7 lata. *Hab.*—Baudin Island, N.W. Australia.

This species has much the general aspect of *H. delessertiana*. It is, however, flatter, and, of course, quite different in sculpture.

Var. *Cassiniensis*, Pl. VII. Fig. 12.

Testa typo minor, umbilico paulo angustiore, apertura magis contracta, peristomate leviter crassiore. Diam. maj. 14.5, min. 10.5 mm.; alt. 7 mm. Apertura 5 alta, 5 lata. *Hab.*—Cassini Island, N.W. Australia.

Although smaller, and differing from the type in the points referred to, it seems advisable to consider this form as a variety, rather than as a distinct species.

HELIX (CHLORITIS) RECTILABRUM, n.sp. Pl. VII. Fig. 14. B.M.

Testa orbicularis, depressa, umbilicata, pallide fuscescens, subgranulata, epidermide scabra tenui induta; spira parum elata, ad apicem obtusa; anfractus 5 lente crescentes, convexi, sutura profunda sejuncti, ultimus ad peripheriam rotundatus, vix angulatus, antice leviter descendens; apertura fere horizontalis, lunata; peristoma tenue, anguste expansum et reflexum, marginibus conniventibus, *basali rectiusculo*, columellari ad insertionem dilatato. Diam. maj. 13, min. 11 mm.; alt. 6 mm. Apertura 4 alta, 5.5 lata. *Hab.*—Parry Harbour, N.W. Australia.

A dead specimen devoid of epidermis does not appear nearly so granular as fresh-living examples, although traces of the granulation, especially upon the apical whorls, are discernible.

HELIX (GONOSTOMA) BAUDINENSIS, Smith. B.M.

The Conchologist, vol. ii. p. 97, fig.

Hab.—Baudin Island, N.W. Australia.

HELIX (GONOSTOMA) COLLINGII, Smith. B.M.

The Conchologist, vol. ii. p. 98, fig.

Hab.—Baudin Island.

This and the preceding species are two of the most interesting discoveries among the land-shells of N.W. Australia and the adjacent Islands made by Mr. Walker.

HELIX (RHAGADA) LEPTOGRAMMA, Pfeiffer. B.M.

Pilsbry, in Tryon's *Man. Conch.* ser. II. vol. vi. p. 186.

Hab.—Cygnet Bay, King Sound, N.W. Australia (Pfr.); Roebuck Bay, South of King Sound (Walker).

Mr. Walker obtained only a single small dead specimen, but this is quite sufficient to confirm the original locality assigned to this species.

HELIX (RHAGADA) REINGA (Gray), Pfeiffer. B.M.

Helix (Rhagada) Reinga, Pilsbry, *T.c.* p. 185.

Hab.—Port Essington and Daupier Archipelago (Brit. Mus.); Roebuck Bay (J. J. Walker); Burner Ranges, east of King Sound (Cox).

It seems to me probable that the *H. torulus*, Fér., is identical with this species. It was collected by Péron during one of the early French voyages, but the exact part of Australia where he obtained it is not stated. A specimen from Burner Ranges presented to the British Museum (Natural History) by Dr. J. C. Cox is rather flatter than most specimens, and somewhat more finely sculptured.

HELIX (RHAGADA) RICHARDSONII, Smith. B.M.

Pilsbry, *T.c.* p. 185.

Hab.—Depuch's Island, somewhat to the north-east of Cossack (Brit. Mus.).

H. elachystoma, Martens (Pilsbry, p. 187), is evidently identical with this species. It was described from specimens from Mermaid Strait, situated a little to the west of Cossack.

HELIX (RHAGADA) CONVICTA, COX. B.M.

Pilsbry, *T.c.* p. 187.

Hab.—Nichol Bay (Cox); Mermaid Strait (Martens); Cossack and Bezout Island (J. J. Walker).

This species is larger than either *H. Reinga* or *H. Richardsonii*, which occur in the same part of West Australia. It is rather solid, and never appears to have more than the one pellucid zone just above the periphery. On the contrary, the bands in the two other species referred to are coloured, and the supra-peripheral one is much broader and darker than the rest, which are more or less variable in number.

HELIX (RHAGADA) TESCOURUM, BENSON. B.M.

Pilsbry, *T.c.* p. 187.

Hab.—Shark's Bay, West Australia (Benson).

In form and size this species is very like *H. convicta*; it is, however, remarkable for the caniculate suture.¹ Only a few dead and much

¹ It is within the range of possibility that this feature may be due to weathering. If, in reality, such be the case, this species should undoubtedly be united with *H. convicta*.

worn specimens, one of which is in the British Museum (Natural History), are known, consequently it is uncertain whether in fine condition it does not exhibit colour-bands.

HELIX (RHAGADA) INCONVICTA, n.sp. Pl. VII. Fig. 10. B.M.

Testa depressa, medio plus minus carinata, anguste umbilicata, albida vel dilute fusco-alba, infra carinam vel angulum zona grisea subpellucida cineta, striis incrementi obliquis areuatis tenuissimis sculpta; anfractus 6 regulariter et lente crescentes, convexiusculi, sutura parum profunda sejuncti, ultimus antice leviter descendens, postice in medio carinatus, carina aperturam versus evanida; spira brevis, convexa, conoidea, ad apicem medioeriter obtusa; apertura oblique lunata, intus pallidissime rufescens; peristoma album, expansum et reflexum, margine columellari incrassato, intus vix subdentato, superne dilatato, umbilicium semi-obtegente. Diam. maj. 20·5, min. 17·5 mm.; alt. 12 mm. Apertura 7 alta, 9 lata. *Hab.*—Oscar Ranges, 120 miles south-east of King Sound, N.W. Australia.

This species is much more depressed than the other forms of *Rhagada* from this part of Australia, and is remarkable for its carination of the body-whorl. It may be likened to a specimen of *H. convicta* which (if it were possible) had been much compressed, thus producing an angular periphery. The single specimen in the British Museum (Natural History) was presented about five years ago by Dr. J. C. Cox, of Sydney.

HELIX (RHAGADA) PLECTILIS, Benson. B.M.

Pilsbry, *T.c.* p. 188.

Hab.—Shark's Bay and Swan River, W. Australia.

HELIX (RHAGADA) CARCHARIAS, Pfeiffer.

Pilsbry, *T.c.* p. 189.

Hab.—Shark's Bay, W. Australia.

HELIX (HADRA) OBLIQUIRUGOSA, n.sp. Pl. VII. Fig. 17. B.M.

Testa globosa, anguste perforata, alba, epidermide tenui lutescente induta, lineis incrementi obliquis striata, undique irregulariter oblique corrugata; anfractus 5 convexi, celeriter crescentes, sutura profunda sejuncti, ultimus magnus, globosus, antice leviter descendens; apertura obliqua, late lunata, alba; spira medioeriter elata, ad apicem medioeriter obtusa; peristoma leviter incrassatum, superne vix expansum, inferne paulo reflexum, margine columellari latius dilatato præcipue ad insertionem, umbilicium partim obtegente. Diam. maj. 21, min. 16·5 mm.; alt. 18 mm. Apertura 14 longa, 10 lata. *Hab.*—Parry Harbour, N.W. Australia.

Only dead specimens of this species were obtained, almost entirely denuded of the periostracum. The remains of it, however, within the aperture show that it was of a yellowish tint. One example, fresher than the rest, has the spire of a very pale brownish tint, so it is likely that this species, when living, is of a light brownish colour above and covered with a thin periostracum.

HELIX (HADRA) PRUDHOENSIS, n.sp. Pl. VII. Fig. 9. B.M.

Testa umbilicata, globosa (albida, epidermide flavescente induta?); anfractus 5 convexi, celeriter crescentes, lineis incrementi obliquis striati, ultimus magnus, inflatus, antice subito oblique descendens; spira obtuse conoidea; apertura rotundato-lunata, longit. totius $\frac{2}{3}$ adaequans; peristoma intus leviter incrassatum, superne vix expansum, antice leviter effusum, marginibus callo tenui junctis, columellari obliquo, reflexo, superne dilatato, umbilicum semiobtegente. Diam. maj. 25, min. 20 mm.; alt. 22 mm. Apertura 14 longa, 11.5 lata. *Hab.*—Prudhoe Island, N.W. Australia (Lieut. J. W. Combe, H.M.S. "Penguin," September, 1891).

This is a smooth globular species, probably without much coloration, judging from the only two specimens at hand. These are in a dead condition, without any trace of colour, and probably are more or less bleached. The umbilicus is deep and moderately broad; the inner edge of the oblique columella is gently arcuate, but the outer margin is almost straight or faintly incurved.

HELIX (HADRA) BURNERENSIS, n.sp. Pl. VII. Fig. 18. B.M.

Testa subobtecte umbilicata, depresso globosa, sordide albida, infra suturam zona lutea obsoleta cineta, nitida, striis incrementi tenuissimis obliquis arcuatis, aliisque spiralibus minutis sculpta; anfractus 6 convexiusculi, lente accrescentes, ultimus vix descendens, pone labrum et circa umbilicum luteo tinctus, postice in medio obsolete angulatus; spira convexe conoidea, ad apicem obtusiuscula; apertura obliqua, lunata, alba; peristoma fusco-carneum, tenue, expansum, margine columellari reflexo, umbilicum fere obtegente, intus vestigium dentis exhibente. Diam. maj. 19, min. 16.5 mm.; alt. 13 mm. Apertura 7 alta, 8 lata. *Hab.*—Burner Ranges, Derby District, N.W. Australia (Cox, in British Museum).

Of this species there is only a single adult and two young examples in the British Museum (Natural History), presented by Dr. J. C. Cox. This species, in the young state, is widely perforate to the apex, and the body-whorl is rather acutely angled at the periphery. This angulation is only just traceable in the adult shell. It is allied to *H. Sykesi*, but is smaller, is less elevated, has a more coloured lip, and is destitute of the brown bands, or exhibits a mere trace of one immediately below the suture in the body-whorl.

HELIX (HADRA) MONTALIVETENSIS, n.sp. Pl. VII. Fig. 21. B.M.

Testa depresso globosa, anguste umbilicata, mediocriter tenuis, nitida, cornea, superne rufo bi-cingulata, circa umbilicum rufo tincta; spira breviter convexe conoidea, ad apicem obtusa; anfractus 6 lente crescentes, convexiusculi, striis tenuibus obliquis arcuatis, aliisque spiralibus tenuissimis plus minus obsoletis sculpti, ultimus antice leviter descendens, infra medium haud zonatus; apertura leviter obliqua, lunata; peristoma tenue, albidum, breviter expansum, margine columellari perobliquo, rectiusculo, intus incrassato, subdentato, superne ad insertionem rufo, dilatato, umbilicum semi-

obtegente. Diam. maj. 21·5, min. 18 mm.; alt. 14 mm. Apertura 8 alta, 10 lata. A smaller example is 19 mm. in its greater diameter and 11·5 in height. *Hab.*—Montalivet Island, N.W. Australia.

This species varies somewhat in size, judging from the five specimens collected by Mr. Walker. They appear, however, to be quite constant in coloration. Of the two red narrow bands which ornament the upper part of the whorls, the upper one borders the suture and the lower is a trifle above it. In the body-whorl the lower zone is just above the periphery. The thickening near the middle of the columellar margin of the aperture is evident in all the examples, but it hardly amounts to a tooth. It is of a whiter tint than the rest of the peristome.

HELIX (HADRA) SYKESI, n.sp. Pl. VII. Fig. 8. B.M.

Testa *H. Montalivetensis* similis, sed altior, umbilico fere obtecto, columella minus dentata, roseo-purpurea. Diam. maj. 21·5, min. 18 mm.; alt. 17 mm. Apertura 8·5 longa, 10 lata. *Hab.*—Parry Island, Admiralty Gulf, N.W. Australia.

This species is very like *H. Montalivetensis*, but is distinguishable by the above characteristics, which are quite constant in the five specimens of each form examined. In coloration and sculpture they are quite similar, but there is a marked difference in form owing to the greater elevation of the spire in *H. Sykesi*. The columellæ also are dissimilar.

HELIX (HADRA) IMITATA, n.sp. Pl. VII. Fig. 15. B.M.

Testa *H. Montalivetensis* similis, sed superne lineis incrementi multo fortioribus, umbilico fere clauso, anfractu ultimo magis descendente. Diam. maj. 19·5, min. 17 mm.; alt. 14·5 mm. Apertura 7 longa, 8 lata.

Var. *Cassiniensis*, Pl. VII. Fig. 16. Testa minor, peristomate conspicue incrassato. Diam. maj. 14–18 mm.

Hab.—Baudin, N. Maret, and Condillac Islands, also at Cape Bougainville, N.W. Australia. Var. at Cassini Island.

This and the two preceding species are similarly banded, and are very much alike in general appearance. Still they present certain differences which appear to be sufficient to warrant their specific separation. The present species is much more strongly sculptured than the others, the lines of growth amounting to fine costulations. The umbilicus is as much closed as in *H. Sykesi*, but is not tinted, the lip more thickened, especially in the variety from Cassini Island, and the last whorl is generally more deflected.

HELIX (TRACHIA) DERBYANA, n.sp. Pl. VII. Fig. 19. B.M.

Testa orbicularis, depressa, medioeriter late umbilicata, subpellucida, cornea, superne irregulariter luteo vel albedo strigata vel marmorata, subtus pallidior, nitida; anfractus 5, regulariter lente accrescentes, convexi, oblique tenuiter striati, ultimus ad peripheriam obtuse

angulatus, leviter descendens; spira brevis, obtusa; apertura oblique lunata, parva; peristoma album, margine superiore vix expanso, basali latiore, reflexo, supra umbilicium dilatato. Diam. maj. 11·3, min. 10 mm.; alt. 6·3 mm. Apertura 3·5 longa, 4 lata. *Hab.*—Burner Range, Derby District, N.W. Australia.

A shell of a general brownish horn colour above, and paler beneath. The strigation or mottling of the upper surface does not extend beyond the peripheral angulation.

HELIX (TRACHIA) BATHURSTENSIS, n.sp. Pl. VII. Fig. 20. B.M.

Testa (pallide cornea?) depressa, orbicularis, mediocriter umbilicata, nitida; anfractus 5-5½, convexi, lente crescentes, superne costulis tenuibus confertis arcuatis obliquis ornati, apicales duo læves, ultimus in medio rotundatus, infra peripheriam striis vel liris tenuioribus ornatus, antice leviter descendens; apertura late lunata, obliqua; peristoma album, undique mediocriter expansum et reflexum. Diam. maj. 15·5, min. 13 mm. Apertura 5·5 alta, 6 lata. *Hab.*—Heywood Island and Bathurst Island, King Sound, N.W. Australia.

Two dead specimens, one from each of the above localities, are all that was found of this species. It is very like *H. Delessertiana*, of Le Guillou, which occurs further north in the islands of Torres Straits, but may be distinguished by the finer, closer, and more regular character of the costulations. The specimen from Bathurst Island has half a whorl less than the other example from Heywood Island, and is in consequence a little smaller, its greater diameter being 13·5 millimetres. It is, however, adult, having completed the formation of the peristome as in the other specimen. The umbilicus is pervious to the apex, and the convolution of the whorls is observable within.

HELIX (TRACHIA) GASCOYNENSIS, n.sp. Pl. VII. Fig. 13. B.M.

Testa depressa, orbicularis, late et aperte umbilicata, albida, solidiuscula; anfractus 4, convexi, sutura profunda sejuncti, confertim et minute granulati, rugis obliquis vel plicis irregularibus rugosis instructi, apicales duo læviores, ultimus ad peripheriam rotundatus vel subangulatus, subtus rugosus, antice conspicue descendens; spira plana, apice obtuso, parum prominulo; apertura subhorizontalis, rotundata; peristoma continuum, anfr. ultimo appressum, anguste expansum, margine inferiore latius dilatato. Diam. maj. 12·5, min. 10 mm.; alt. 5·5 mm. Apertura 4 alta, 4·5 lata. *Hab.*—Gascoyne District, W. Australia.

Three specimens of this species were presented to the British Museum (Natural History) in 1891 by Mr. B. B. Woodward, that were collected by his cousin, Mr. H. P. Woodward. It is similar in form to *H. cyrtopleura*, Pfr., from South Australia, but differs in size and sculpture. It is smaller, flatter, and has the peristome more decidedly continuous. Rather a powerful lens is necessary in order to observe the fine granulation which covers the entire surface.

HELIX (XEROPHILA) AUSTRALIS, Menke. B.M.

Cox, *op. cit.* p. 31, pl. ix. fig. 7, copy of Reeve, Con. Ieon. pl. cxxxii. fig. 803

Hab.—Mount Eliza, Swan River.

I am not quite sure that the species figured by Reeve, and copied by Cox, is the true *H. australis*, as it is considerably smaller, measuring fully a line less in diameter. It may, however, be a slip on Menke's part, and the width should have been given as three instead of four lines. I am inclined to think that this may be the case, as Reeve's shell is of the proper height quoted by Menke.

BULIMUS (LIPARUS) DUX, Pfeiffer. B.M.

Cox, *op. cit.* p. 71, pl. xiii. fig. 4; pl. xviii. fig. 16.

Hab.—King George's Sound, S.W. Australia.

BULIMUS (LIPARUS) PONSONBII, Angus. B.M.

Proc. Zool. Soc. 1877, p. 170, pl. xxvi. fig. 1.

Hab.—West Australia.

BULIMUS (LIPARUS) INDUTUS, Menke. B.M.

Cox, *op. cit.* p. 73, pl. xiii. fig. 10.

Hab.—Darling Range, Mount Eliza, Perth, Swan River, W. Australia.

BULIMUS (LIPARUS) MELO, Quoy and Gaimard. B.M.

Cox, *op. cit.* p. 74, pl. xiii. fig. 6.

Hab.—King George's Sound, Hay District, and Freemantle, S.W. Australia.

BULIMUS (LIPARUS) LEEUWINENSIS, n.sp. Pl. VII. Fig. 27. B.M.

Testa perforata, elongato-ovata, superne acuminata, albida, plus minus fusco-corneo strigata et maculata; anfractus 5-6, convexiusculi, sutura subprofunda sejuncti, supremi duo (nucleus) fusciscentes, minute punctati, cæteri longitudinaliter rugose striati, seriebus transversis granulorum pluribus ornati, ultimus elongatus, infra medium haud granulatus, antice leviter oblique descendens; apertura perpendicularis, inverse auriformis, pallide fusco tineta, longit. totius $\frac{1}{2}$ haud æquans; peristoma album, tenue, simplex, acutum, margine basali subeffuso, columellari conspicue reflexo, umbilicium angustum semiobtegente, superne labro callo tenui juncto. Longit. 27 mm.; diam. 12.5 mm. Apertura 12.5 longa, 6.5 lata. *Hab.*—Cape Leeuwin, S.W. Australia.

The apical whorls of this and the allied species, *B. melo*, *B. Kingii*, and a few others, are punctate, like a fine thimble, and the extreme and rather obtuse apex is introverted as it were within the next whorl. The specimens vary somewhat in length, the dimensions given above being those of an average specimen. *B. melo* is a broader and more bulky species, and *B. Kingii* is more acuminate above, less

granular, and exhibits more coloration both externally and within the aperture. The umbilicus is more closed than in the present species, and is surrounded by a brown zone.

BULIMUS (LIPARUS) ONSLOWI, Cox. Pl. VII. Figs. 28-29. B.M.

Cox, *op. cit.* p. 74, pl. xiii. fig. 13.

Hab.—Dirk Hartog Island, W. Australia (Cox and J. J. Walker).

Three dead specimens obtained by Mr. Walker appear to belong to this species. They are adult and larger than that figured by Cox, which has the appearance of being somewhat immature. The largest is 24 mm. long and 16 in diameter; aperture 14 mm. in length, 8 wide. Five other examples are considerably smaller, averaging only 15 to 18 mm. in length. They are a trifle less globose, and more strongly granular just below the suture.

BULIMUS (LIPARUS) BULLA, Menke.

Cox, *op. cit.* p. 73 (unfigured).

Hab.—Darling Range and Perth.

BULIMUS (LIPARUS) BACONI, Benson. Pl. VII. Fig. 32. B.M.

Cox, *op. cit.* p. 73 (unfigured).

Hab.—Darling Range, W. Australia.

BULIMUS (LIPARUS) KINGII, Gray. B.M.

Cox, *op. cit.* p. 75, pl. xiii. fig. 7; Gray, in P. P. King's Narrative of a Survey of the Coasts of Australia, 1827, vol. ii. Appendix, p. 491.

Hab.—King George's Sound, S.W. Australia; abundant on the hills in the vicinity of Bald Head (King).

BULIMUS (LIPARUS) PHYSOIDES, Reeve. Pl. VII. Fig. 30. B.M.

Bulimus physoides (Menke MSS.), Reeve, Con. Icon. pl. lxx. fig. 507.

Var. = *B. Brazieri*, Angas, Proc. Zool. Soc. 1871, p. 19, pl. i. fig. 28.

Hab.—? (Reeve); W. Australia (Mus. Cuming); var. *Brazieri*, Sinclair's Range, King George's Sound (Angas).

This species has been considered by Pfeiffer and Cox a variety of *B. melo*. I am inclined to think that it is sufficiently distinct for specific separation. It is of thinner texture, not quite so broad and robust, has a thinner white columella with a purplish brown zone around the closed umbilical region. In *B. melo* the umbilicus is slightly open, the columella more thickened, more reflexed, and of a purple-brown tint, and there is no basal zone of that colour. In the latter character *B. Kingii* agrees with the present species, but is more elongate in form.

The variety *Brazieri* is rather more coarsely granular than the typical form, but agrees in other respects.

Another variety (Pl. VII. Fig. 31) is like the type, excepting in

colour. It is of a rich purple-brown, with only a few irregular streaks of creamy white, and a sub-basal yellowish band, which appears quite white within the aperture.

Family PUPIDÆ.

PUPA PACIFICA, Pfeiffer. B.M.

Bulinus pacificus, Pfr., Proc. Zool. Soc. 1846, p. 31; *id.* Mon. Hel. ii. p. 309; Küster Conch. Cab. pl. xix. fig. 26-28; Smith, Zool. Erebus, Moll. p. 3, pl. iv. fig. 6; Cox, *op. cit.* p. 68, pl. xiii. fig. 3. *Hab.*—Hardy Island, N. Queensland (Pfr.), Mabuiag, Torres Straits (Haddon); Pigeon Island, near Wallaby Island, Houtmans Abrolhos, W. Australia (Smith); Roebuck Bay, Baudin and Cassini Islands, N.W. Australia (Walker); Brisbane, and other localities in Queensland (Cox).

All the specimens from Cassini Island are sinistral; otherwise they resemble the normal form. Jickeli considers this species synonymous with the North American *P. fallax* of Say. It seems to me, however, sufficiently distinct. It is less elongate, more pyramidal, the peristome is differently reflexed, and there is a distinct parietal tubercle close to the insertion of the outer lip.

PUPA LEPIDULA, Adams and Angas.

Cox, *op. cit.* p. 69 (unfigured).

Hab.—Shark's Bay, W. Australia.

PUPA CONTRARIA, n.sp. B.M.

Testa sinistrorsa, rimata, fusco-orcea, oblique tenuissime striata; anfractus $5\frac{1}{2}$ convexi, sutura profunda sejuncti, ultimus penultimo vix latior, antice ascendens; spira elongata, convexa, pyramidalis, ad apicem subglobosa; apertura longit. totius $\frac{1}{3}$ adæquans; peristoma album, expansum, marginibus callo tenui, prope insertionem labri tuberculoso, junctis. Longit. 4.5, diam. 2 mm. Apertura 1.5 mm. longa. *Hab.*—East Wallaby Island, Houtmans Abrolhos (Walker).

This species may possibly prove to be the sinistral form of *P. adelaidæ*, Ad. and Angas, which is only known to me by the description.

PUPA LINCOLNENSIS, Cox. B.M.

Cox, *op. cit.* p. 80, pl. xiv. fig. 16.

Hab.—Port Lincoln, South Australia (Cox); Pigeon Island, near Wallaby Island (Dr. Richardson, in British Museum), and East Wallaby Island, Houtmans Abrolhos (Walker).

This species is described as having only a single tooth or tubercle in the aperture. The specimens collected by Dr. Richardson and Mr. Walker have a second basal tubercle as indicated in Cox's figure, and a third far within upon the columella. It is possible that in the examples examined by Dr. Cox the denticles were only feebly developed, or they may even have been overlooked, being rather indistinct.

PUPA WALLABYENSIS, n.sp. B.M.

Testa dextrorsa, cylindræa, pellucida, alba, anguste rimata; anfractus 5 perconvexi, sutura profunda sejuncti, peroblique striati, ultimus antice ascendens; spira cylindræa, ad apicem obtusa; apertura minima, ringens, longit. totius $\frac{1}{4}$ æquans, denticulis septem inæqualibus (tribus parietalibus minimis, mediano maximo, uno columellari magno, lamelliforme, tribus palatalibus magnis lamelliformibus) instructa; peristoma leviter expansum, marginibus conniventibus, callo tenui junctis. Long. 2.5, diam. 1 mm. *Hab.*—East Wallaby Island, Houtmans Abrolhos (Walker).

The teeth of this species are very characteristic, and block up the aperture to a considerable extent. The three parietal are much smaller than the rest, and situated close together, the central one being the largest. That on the columella is large, lamelliform, and prominent. The central palatal tooth is narrow, long, and extends inwards; those on each side of it are shorter, but a trifle more prominent perhaps.

P. Macdonnelli, Brazier, from Fitzroy Island, N.E. Australia, is a little shorter than this species and has more feeble armature in the aperture.

PUPA MOOREANA, n.sp. Pl. VII. Fig. 25. B.M.

Testa brevis, cylindræa, rimata, fusco-cornea; anfractus 5 perconvexi, lente crescentes, oblique tenuiter striati, sutura profunda sejuncti; spira cylindræa, ad apicem obtusa; apertura rotundata, dentibus quinque inæqualibus (duobus palatalibus, uno columellari, duobus parietalibus) munita, longit. totius $\frac{1}{3}$ æquans; peristoma leviter expansum et reflexum, marginibus conniventibus. Longit. 2, diam. 1 mm. *Hab.*—Roebuck Bay, W. Australia.

The largest tooth is that situated on the whorl midway between the ends of the peristome. It juts out into the aperture and points between the two palatal denticles, which are about the same size as that on the columella. The fifth tubercle is at the insertion of the labrum. Named in honour of Capt. W. U. Moore, R.N., in command of the "Penguin."

Family SUCCINEIDÆ.

SUCCINEA SCALARINA, Pfeiffer. Pl. VII. Fig. 24. B.M.

Cox, *op. cit.* p. 89 (unfigured).

Hab.—King George's Sound, S.W. Australia; E. Wallaby Island, Houtmans Abrolhos, W. Australia (Walker).

SUCCINEA STRIGILLATA, Adams and Angas.

Cox, *op. cit.* p. 89, pl. xv. figs. 5, 5a.

Hab.—Shark's Bay, W. Australia.

SUCCINEA APERTA, Cox.

Cox, *op. cit.* p. 90, pl. xvii. figs. 6-6b.

Hab.—King George's Sound, S.W. Australia.

Family CYCLOPHORIDÆ.

CYCLOPHORUS LIRICINCTUS, Benson.

Cox, *op. cit.* p. 97, pl. xvi. fig. 4.

Hab.—Shores of W. Australia (Benson); shores of Swan River (Reeve).

CYCLOPHORUS ORBICULATUS, Benson.

Cox, *op. cit.* p. 98, pl. xvi. fig. 5.

Hab.—Same as preceding species.

Family TRUNCATELLIDÆ.

COXIELLA, n.g.

Shell similar to that of the genus *Tomichia*, Benson. Operculum concentric, not paucispiral. Animal unknown.

This genus differs from *Tomichia* in having a concentric instead of a paucispiral operculum. It is named in honour of Dr. J. C. Cox, of Sydney, so well known for his writings on Australian Mollusca.

The name *Coxia* has already been employed by M. Ancey for a group of *Helicidæ*, of which *Helix Macgregori*, Cox, is the type.

COXIELLA STRIATULA, Menke. B.M.

Truncatella striatula, Menke, Moll. Nov. Holland, p. 9.

Blanfordia striatula, Cox, *op. cit.* p. 95, pl. xv. figs. 13, 13*b*.

Blanfordia pyrhostoma, Cox, *op. cit.* p. 95, pl. xv. figs. 14, 14*a*.

Hab.—Western sandy coast (Menke); Cossack west coast (Brit. Mus.); Shark's Bay (Cox); Adelaide, South Australia (Cox); Sandridge, Hobson's Bay (Craven, in Brit. Mus.); and Melbourne, Victoria (Cox).

The species is quoted by Fischer (Manuel, p. 752) as representing Adams's genus *Blanfordia*. This is a mistake, for the two species originally placed in that genus by the author of it (Ann. Mag. Nat. Hist. 1863, vol. xii. p. 424) are quite distinct conchologically and in the localities they inhabit. *Blanfordia* is more terrestrial in its habits, living "on damp banks covered with vegetation in rocky situations near the sea," whereas the present species, *Coxiella striatula*, appears to be littoral. The peristome in the latter does not exhibit the strong external varix of *Blanfordia*, the operculum of which is said to be subspiral, whereas that of the present species is concentric. Cox describes it as "paucispiral," but this, I think, must be a mistake, for the opercula which I have examined are certainly concentric, and in Cox's own figure, pl. xv. fig. 13*e*, no paucispiral element is shown. The operculum of the type of the genus *Tomichia* undoubtedly is paucispiral, as described by Benson.

Family HELICINIDÆ.

HELICINA WALKERI, n.sp. Pl. VII. Fig. 26. B.M.

Testa parva, depresso conica, plerumque rufescens, ad peripheriam pallida, interdum omnino aut rufescens aut pallida; anfractus 4 convexiusculi, striis incrementi tenuissimis aliisque microscopicis obliquis plus minus sculpti, ultimus in medio acute rotundatus, antice levissime descendens, inferne callo centrali pellucido instructus; apertura obliqua; peristoma pallidum, anguste expansum. Diam. maj. 5, min. 4·3 mm.; alt. 3·5 mm. *Hab.*—Queens, Baudin and Parry Islands.

This is a larger species than *H. jana*, Cox, from Port Macquarie, and has no spiral striae on the body-whorl.

EXPLANATION OF FIGURES ON PLATE VII.

- | | | | |
|------|---------|---------------------------------|--|
| Fig. | 2. | Scissurella Lytteltonensis. | } For descriptions see <i>ante</i> ,
pp. 57-59. |
| „ | 3. | Photinula Suteri. | |
| „ | 4, 5. | Aemaea Helmsi. | |
| „ | 6, 7. | Lepeta? alta. | |
| „ | 8. | Helix (Hadra) Sykesi. | |
| „ | 9. | „ „ Prudhoeensis. | |
| „ | 10. | „ (Rhagada) inconvicta. | |
| „ | 11. | „ (Chloritis) millepunctata. | |
| „ | 12. | „ „ „ (var. Cassiniensis). | |
| „ | 13. | „ (Trachia) Gascoynensis. | |
| „ | 14. | „ (Chloritis) rectilabrum. | |
| „ | 15. | „ (Hadra) imitata. | |
| „ | 16. | „ „ „ (var. Cassiniensis). | |
| „ | 17. | „ „ obliquirugosa. | |
| „ | 18. | „ „ Burnerensis. | |
| „ | 19. | „ (Trachia) Derbyana. | |
| „ | 20. | „ „ Bathurstensis. | |
| „ | 21. | „ (Hadra) Montalivetensis. | |
| „ | 22, 23. | Lamprocystis lissa. | |
| „ | 24. | Succinea scalarina. | |
| „ | 25. | Pupa Mooreana. | |
| „ | 26. | Helicina Walkeri. | |
| „ | 27. | Bulimus (Liparus) Leeuwinensis. | |
| „ | 28. | „ „ Ouslowi. | |
| „ | 29. | „ „ „ (small var.). | |
| „ | 30. | „ „ physoides. | |
| „ | 31. | „ „ „ (var.). | |
| „ | 32. | „ „ „ Baconi. | |